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SURFACE TRANSPORTATION RESEARCH AND DEVELOPMENT ACT OF 1991

DECEMBER 6, 1991.—Ordered to be printed

Mr. BROWN, from the Committee on Science, Space, and Technology, submitted the following

REPORT

[To accompany H.R. 2941]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 2941) to authorize appropriations to the Department of Transportation for surface transportation research and development, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

49-677

H703-11

SECTION 1. SHORT TITLE.

This Act may be cited as the "Surface Transportation Research and Development Act of 1991".

SEC. 2. FINDINGS.

The Congress finds that—

(1) despite an annual expenditure in excess of $10,000,000,000 on surface transportation and its infrastructure, the Federal Government has not developed a clear vision of—

(A) how the surface transportation systems of the 21st century will differ from the present;

(B) how they will interface with each other and with other forms of transportation;

(C) how such systems will adjust to changing American population patterns and lifestyles; and

(D) the role of federally funded research and development in ensuring that appropriate transportation systems are devleoped and implemented;

(2) the population of the United States is projected to increase by over 30,000,000 people within the next 20 years, mostly in existing major metropolitan areas, which will result in increased traffic congestion within and between urban areas, more accidents, loss of productive time, and increased cost of transportation unless new technologies are developed to improve public transportation within cities, to move people and goods between cities, to connect air and sea transportation with final destinations, and to decrease repair costs for rail and highway infrastructures;

(3) 18,000,000 crashes, 4,000,000 injuries, and 45,000 fatalities each year on the Nation's highways are intolerable, and substantial research is required in order to develop safer technologies in their most useful and economic forms;

(4) current research and development funding for surface transportation is insufficient to provide the United States with the technologies essential to providing its own advanced transportation systems in the future, and as a result the United States is becoming increasingly dependent on foreign surface transportation technologies and equipment to meet its expanding surface transportation needs;

(5) a more active, focused surface transportation research and development program involving cooperation among the Federal Government, United States based industry, and United States universities should be organized on a priority basis;

(6) the automobile will remain the principal mode of surface transportation in the United States into the foreseeable future, but will need new materials, equipment and systems in order to be safer and to take advantage of intelligent vehicle highway systems (IVHS);

(7) intelligent vehicle highway systems represent the best near-term technology for improving surface transportation for public benefit by providing highways and automobiles with equipment which can improve flow and provide for enhanced safety;

(8) high speed rail systems designed for long distance travel are expanding rapidly in Europe and Japan, but not in the United States;

(9) There is technical expertise in high speed rail in the United States but this expertise is waning because the United States does not build its own rail systems;

(10) magnetically levitated (maglev) trains, which, potentially could supplement and be as efficient as air travel between major cities in the United States, have been developed and tested in Canada, Germany, Great Britain, Japan, and the Soviet Union, but have not been developed to a state-of-the-art which would make them commercially viable, as evidenced by the fact that no current projects are underway to build a commercial operating maglev system in any country, primarily because of the high capital cost associated with the state of the technology.

(11) high speed rail, maglev, and air transport are inefficient when passengers cannot get to the stations and terminals without using private automobiles, or buses that are inefficient, slow, polluting, and energy intensive, making research in short haul passenger transportation systems an important priority;

(12) the Federal Government spends insufficient time and effort on research and development programs to improve the efficiency and safety of existing highway and rail-based surface transportation systems or to increase the useful life while decreasing the life cycle costs of their infrastructure;

(13) research and development programs related to surface transportation are fragmented and dispersed throughout government, and need to be strengthened and incorporated in an integrated framework within which a consensus on the goals of a national surface transportation research and development program must be developed;

(14) the inability of government agencies to cooperate effectively, the difficulty of obtaining public support for new systems and rights-of-way, and the high cost of capital financing discourage private firms from investing in the development of new transportation equipment and systems; therefore the Federal Government should sponsor and coordinate research and development of new technologies to provide safer, more convenient, and affordable transportation systems for use in the future; and

(15) an effective high technology applied research and development program should be implemented quickly by strengthening the Department of Transportation research and development staff and by contracting with private industry for specific development projects.

SEC. 3. SURFACE TRANSPORTATION RESEARCH AND DEVELOPMENT PLAN.

(a) PLAN.—The Secretary of Transportation (hereafter in this Act referred to as the "Secretary") shall develop an integrated national plan (hereafter in this Act referred to as the "Plan") for surface transportation research and development, including details of the programs described in section 4, with provisions for appropriate funding levels and a schedule with milestones, preliminary cost estimates, appropriate work scopes, personnel requirements, and estimated costs and goals for the next 3 years for each area of research and development. The Plan shall also include a 10-year projection of long-term research and development. Recommendations for the appropriate source or mechanism for surface transportation research and development funding, taking into account the recommendations of the Research and Development Coordinating Council of the Department of Transportation, shall also be included. The initial Plan shall be submitted to the Congress within 180 days after the date of enactment of this Act. The Plan shall be reviewed and updated, with comments and recommendations submitted to the Congress, annually. The Plan shall focus on those surface transportation systems needed for future urban, suburban, and rural areas in the next decade. A primary component of the Plan shall be cooperation with industry in carrying out section 4 and to strengthen the manufacturing capabilities of United States firms in order to produce products for surface transportation systems. In any case where a different technology or alternative program can accomplish the same or better results than those described in section 4, the Secretary may make recommendations for the alternative, and shall promptly report such recommendations to the Congress.

(b) CONFORMANCE WITH PLAN.—All surface transportation research and development within the Department of Transportation shall be included in the Plan and shall be evaluated in accordance with the Plan.

(c) OBJECTIVES OF PLAN.—The plan shall provide for the development of a range of technologies, within the shortest time possible, needed to produce convenient, safe, affordable, modes of surface transportation to be available for public use beginning in the mid 1990's and for maintaining a long-term advanced research and development program to provide for next generation surface transportation systems.

(d) COORDINATION.—In developing the Plan and in carrying out section 4, the Secretary shall consult with and, where appropriate, use the expertise of other Federal agencies and their laboratories.

SEC. 4. RESEARCH AND DEVELOPMENT PROGRAMS.

(a) AUTOMOTIVE.—The Secretary shall initiate highway vehicle research, development, and testing programs in conjunction with industry for the further improvement of vehicle structures in order to reduce impact loads on the occupants during collisions, for the continuing development of energy-absorbing structures, and to reduce the number and severity of collisions. Such programs shall include—

(1) a composite structures research and development program;

(2) a program for research, development, and prototype testing of safety systems;

(3) further measures to examine and test the dynamics of trucks with multiple trailers, capable of determining the mass acceleration and deceleration characteristics of various load combinations under likely maneuvering and braking situations; and

(4) a research and development program for the purpose of developing technologies to quantify reckless driving and to reduce the incidence of reckless driving.

(b) ADVANCED AUTOMOTIVE TECHNOLOGIES.—(1) The Secretary shall support an industry-led research and development program to—

(A) develop generic, precommercial technologies that will advance the United States automotive industry in new technology;

(B) conduct long-term, high-risk basic research, jointly with academia, that would enhance United States competitiveness and facilitate industry's commercial adoption of advanced technologies; and

(C) foster the transfer of advanced manufacturing technologies by utilizing the regional manufacturing technology transfer program at the National Institute of Standards and Technology and the other technology transfer programs at Federal laboratories.

(2) The Secretary, in carrying out this subsection, may make grants to universities or other research organizations for conducting research and development activities.

(c) INTELLIGENT VEHICLE HIGHWAY SYSTEMS.—The Secretary shall develop an automated highway and vehicle prototype from which future fully automated intelligent vehicle-highways systems can be developed. Such development shall include research in human factors to ensure the success of the man-machine relationship. The goal of this program is to have the first fully automated roadway in operation by 1997. The system shall accommodate installation of equipment in new and existing motor vehicles.

(d) HIGH SPEED RAIL SYSTEMS.—

(1) REVIEW OF LITERATURE.—The Secretary shall review all available technical literature pertaining to the French, German, and Japanese high speed rail systems and consult with engineers involved in those systems for the purpose of determining the most effective and efficient technologies that could be applied to the introduction of high speed rail systems in the United States. This review shall include construction technologies, including track placement robotics, power transfer technologies, and rail maintenance technologies unique to high speed rail systems.

(2) RECOMMENDATION.—Based on the results of the review under paragraph (1), the Secretary shall make a recommendation on the appropriateness of technologies for constructing high speed rail systems in the United States which are to such standards and compatibility so as to facilitate their interconnection across the country in the future. The Plan shall describe the Secretary's findings and identify requirements for additional research and development.

(3) REPORT ON INDUSTRIAL POTENTIAL.—The Secretary shall prepare a report concerning the potential for rebuilding United States industrial strength in rail technologies. The report should carefully appraise the engineering and manufacturing potential of United States industries, including suppliers, and identify management, labor, equipment, and facility shortcomings. The report shall be submitted to the Congress by July 1, 1992.

(4) EXAMINATION OF RESEARCH POTENTIAL.—The Secretary shall examine the potential of United States industries and universities to conduct research on and to participate in the development of high speed rail systems, including the potential to develop the "next generation" high speed rail transportation and produce a superior product that is competitive in the global marketplace.

(5) EXAMINATION OF TECHNICAL RESEARCH NEEDS.—The Secretary shall examine the significant unresolved research and development issues surrounding the design, engineering, construction, and operation of high speed rail transportation systems.

(e) MAGNETICALLY LEVITATED SYSTEMS.—The Secretary shall propose and conduct a research and development program on magnetically levitated suspension and guidance systems, including the use of entities with demonstrated expertise in the fabrication of superconducting magnets, and an investigation of the possibility of international cooperation using superconducting magnet systems. The Secretary shall conduct a study to assess the technological feasibility and generic research needed for developing an operational magnetic levitation system in the United States. To be included in the study are potential operational cost estimates and the economic benefits. The Secretary shall keep informed a progress in ongoing research on high temperature superconducting materials in expectation of significant progress in that field of basic research. The program proposed under this subsection shall address—

(1) coach design minimizing weight while retaining a high degree of passenger comfort and safety, including provisions for shielding against electromagnetic radiation;

(2) advanced propulsion and levitation systems using superconducting materials;

(3) reducing the capital cost of magnetic levitation, including emphasis on research on guideway configuration, materials, and automated manufacturing techniques; and

(4) in conjunction with the National Aeronautics and Space Administration, computer analysis and wind tunnel verification to determine the aerodynamic stability of magnetically levitated vehicles for safety purposes under all anticipated operating and wind conditions.

The Secretary shall transfer to United States industry any information, obtained through research conducted under this subsection or otherwise, that would promote the development of a viable commercial magnetically levitated rail transportation industry within the United States.

(f) SHORT HAUL PASSENGER TRANSPORTATION SYSTEMS.—The Secretary shall conduct necessary systems research in order to develop a concept for a lightweight, pneumatic tire multiple-unit, battery powered system, in conjunction with recharging stations at strategic locations. The Secretary shall create a potential systems concept and, as part of the Plan, shall make recommendations to the Congress by July 1, 1992.

(g) SUPPORTING INFRASTRUCTURE.—The Secretary shall strengthen and expand surface transportation infrastructure research and development. The expanded program shall include the following elements:

(1) Methods and materials for improving the durability, thereby extending the life of bridge structures, including new and innovative technologies to reduce corrosion.

(2) Expansion of the Department of Transportation's inspection and mobile nondestructive examination capabilities, including consideration of the use of high energy field radiography for more thorough and more frequent inspections of bridge structures.

(3) The development of a concept for robotic highway and road repair machinery using robotic technologies which would result in a durable, smooth, and level surface.

(4) The Secretary shall conduct a research and development program on new materials which are compatible with technologies developed under paragraph (3) and which will retain structural integrity through repeated loading cycles over a minimum of 10 years of high volume use.

(5) The Secretary shall determine whether to initiate a construction equipment research and development program directed toward the reduction of costs associated with the construction of highway and mass transit systems. The results of the inquiry shall be submitted to the Congress by July 1, 1992.

(6) In conjunction with a university or universities, the use of computer simulation techniques to study the dynamics of high speed rail and magnetically levitated train systems acting on bridge and elevated guideway structures. This effort shall be directed toward the eventual reduction of the initial and maintenance costs, and to the extension of the useful life, of such structures.

(7) The Secretary shall review Department of Transportation and State construction projects and submit a report to Congress within 1 year after the date of enactment of this Act, containing recommendations for research that could reduce the time and cost of repairing and building transportation facilities.

(8) The Secretary shall undertake or supervise surface transportation infrastructure research to develop—

(A) nondestructive evaluation equipment for use with existing structures and for the "next generation" structures that utilize advanced materials;

(B) information technologies, including—

(i) appropriate computer programs to collect and analyze data on the status of the existing infrastructure facilities for enhancing management, for growth, and for capacity; and

(ii) dynamic simulation models of surface transportation systems for predicting capacity, safety, and infrastructure durability problems, for evaluating planned research projects, and for testing the strengths and weaknesses of proposed revisions in surface transportation operations programs; and

(C) new and innovative technologies to enhance and facilitate field construction and rehabilitation techniques for minimizing disruption during repair and maintenance of existing structures.

(9)(A) The Secretary shall conduct a study on the potential for increased recycling of automobile components in the United States and the steps needed to increase such recycling. Such study shall consider—

(i) the major obstacles to increased recycling of automobile components and how those obstacles can be overcome, by research and other means;

(ii) methods for incorporating recyclability into the planning, design, and manufacturing of new automobiles;

(iii) an identification of the toxic and nonrecyclable materials currently used in automobiles, possible substitutes for those materials, and research needed to identify and develop appropriate substitutes; and

(iv) potential methods and recommended research for engineering new materials for use in automobiles that would be more easily recyclable.

(B) In conducting the study under subparagraph (A) and preparing the report under subparagraph (C), the Secretary shall consult with representatives of the automobile manufacturing industry, the recycling industry, the research community, automotive materials industries, the automotive dismantling industry, State and local governments, and appropriate nongovernmental organizations.

(C) Not later than 1 year after the date of enactment of this Act, the Secretary shall submit a report to the Congress on the results of such study and of the consultations under subparagraph (B).

(10) The Secretary shall conduct a research and development program on the use of nonhazardous solid wastes from industrial, commercial, mining, agricultural, and community activities, which constitute a costly disposal problem and harm the environment, in the construction of the surface transportation system. Such nonhazardous solid wastes include cement and concrete, paper, rerefined oil, tires, rubber, insulation products, plastics, metals, glass, and wood.

SEC. 5. RESEARCH ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish an independent surface transportation research advisory committee.

(b) PURPOSES.—The advisory committee shall provide ongoing advice and recommendations to the Secretary regarding needs, objectives, plans, approaches, content, and accomplishments with respect to short-term and long-term surface transportation research and development. The advisory committee shall also assist in ensuring that such research and development is coordinated with similar research and development being conducted outside of the Department of Transportation.

(c) MEMBERSHIP.—The advisory committee shall be composed of not less than 20 and not more than 30 members appointed by the Secretary from among persons who are not employees of the Department of Transportation and who are specially qualified to serve on the committee by virtue of their education, training, or experience. A majority of the members of the advisory committee shall be individuals with experience in conducting surface transportation research and development. The Secretary in appointing the members of the advisory committee shall ensure that universities, corporations, associations, consumers, and other Federal and State Government agencies are represented on an equitable basis.

(d) CHAIRMAN.—The Chairman of the advisory committee shall be designated by the Secretary.

(e) PAY AND EXPENSES.—Members of the advisory committee shall serve without pay, except that the Secretary may allow any member, while engaged in the business of the advisory committee or a subordinate committee, travel expenses, including per diem in lieu of subsistence, in accordance with sections 5702 and 5703 of title 5, United States Code.

(f) SUBORDINATE COMMITTEES.—The Secretary shall establish a subordinate committee to the advisory committee to provide advice on advanced automotive technology research and development, and may establish other subordinate committees to provide advice on specific areas of surface transportation research and development. Such subordinate committee shall be subject to subsections (e), (g), and (i) of this section.

(g) ASSISTANCE OF SECRETARY.—Upon request of the advisory committee, the Secretary shall provide such information, administrative services, support staff, and supplies as the Secretary determines are necessary for the advisory committee to carry out its functions.

(h) REPORTS.—The advisory committee shall, within one year after the date of enactment of this Act and annually thereafter, submit to the Congress a report summarizing its activities under this section.

(i) TERMINATION.—Section 14 of the Federal Advisory Committee Act shall not apply to the advisory committee established under this section.

SEC. 6. LONG-TERM RESEARCH.

Not less than 15 percent of the amounts appropriated for surface transportation research and development shall be used for long-term research projects. The term "long-term research project," as used in this section, means a research project which is unlikely to be completed within 10 years.

SEC. 7. ADVANCED AUTOMOTIVE CONFERENCE AND AWARD.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701) is amended by inserting after section 17 the following new sections, and by redesignating subsequent sections and all references thereto accordingly:

"SEC. 18. CONFERENCE ON ADVANCED AUTOMOTIVE TECHNOLOGIES.

"Not later than 180 days after the date of enactment of the Surface Transportation Research and Development Act of 1991, the Secretary, through the Under Secretary of Commerce for Technology, in consultation with other appropriate officials, shall convene a conference of domestic motor vehicle manufacturers, parts suppliers, Federal laboratories, and motor vehicle users to explore ways in which cooperatively they can improve the competitiveness of the United States motor vehicle industry by developing new technologies which will enhance the safety and energy savings, and lessen the environmental impact, of domestic motor vehicles, and the results of such conference shall be published and then submitted to the President and to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

"SEC. 19. ADVANCED MOTOR VEHICLE AWARD.

"(a) ESTABLISHMENT.—There is established a National Award for the Advancement of Motor Vehicle Research and Development. The award shall consist of a medal, and a cash prize if funding is available for the prize under subsection (c). The medal shall be of such design and materials and bear inscriptions as is determined by the Secretary of Transportation.

"(b) MAKING AND PRESENTING AWARD.—The Secretary of Transportation shall periodically make and present the award to domestic motor vehicle manufacturers, suppliers, or Federal laboratory personnel who, in the opinion of the Secretary of Transportation, have substantially improved domestic motor vehicle research and development in safety, energy savings, or environmental impact. No person may receive the award more than once every 5 years.

"(c) FUNDING FOR AWARD.—The Secretary of Transportation may seek and accept gifts of money from private sources for the purpose of making cash prize awards under this section. Such money may be used only for that purpose, and only such money may be used for that purpose."

SEC. 8. RESEARCH AND DEVELOPMENT AUTHORITY OF SECRETARY OF TRANSPORTATION.

Section 301(5) of title 49, United States Code, is amended by inserting ", and including basic automotive science" after "to aircraft noise."

SEC. 9. PURPOSES OF DEPARTMENT OF TRANSPORTATION.

Section 101(b)(4) of title 49, United States Code, is amended by inserting ", through research and development or otherwise" after "advances in transportation".

SEC. 10. USE OF DOMESTIC PRODUCTS.

(a) PROHIBITION AGAINST FRAUDULENT USE OF "MADE IN AMERICA" LABELS.—(1) A person shall not intentionally affix a label bearing the inscription "Made in America," or any inscription with that meaning, to any product sold in or shipped to the United States, if that product is not a domestic product.

(2) A person who violates paragraph (1) shall not be eligible for any contract for a procurement carried out with amounts authorized under this Act, including any subcontract under such a contract.

(b) COMPLIANCE WITH BUY AMERICAN ACT.—(1) Except as provided in paragraph (2), the head of each agency which conducts procurements shall ensure that such procurements are conducted in compliance with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a through 10c, popularly known as the "Buy American Act").

(2) This subsection shall apply only to procurements made for which—

(A) amounts are authorized by this Act to be made available; and

(B) solicitations for bids are issued after the date of enactment of this Act.

(3) The Administrator, before January 1, 1994, shall report to the Congress on procurements covered under this subsection of products that are not domestic products.

(c) DEFINITIONS.—For the purpose of this section, the term "domestic product" means a product—

(1) that is manufactured or produced in the United States; and

(2) at least 50 percent of the cost of the articles, materials, or supplies of which are mined, produced, or manufactured in the United States.

SEC. 11. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary for surface transportation research and development—

(1) for fiscal year 1992, $164,500,000, of which at least 8 percent shall be for the programs described in section 4;

(2) for fiscal year 1983, $180,000,000, of which at least 10 percent shall be for the programs described in section 4; and

(3) for fiscal year 1994, $200,000,000, of which at least 15 percent shall be for the programs described in section 4.

I. BACKGROUND

In the Department of Transportation's publication, "Moving America: New Directions, New Opportunities," the Administration has stated its transportation research and development objectives to be:

1. To increase the federal transportation budget for research and technology projects in coordination with the efforts of private industry, the academic community, and State and local governments.

2. To continue research on improvements in design and operation of existing type of vehicles and transportation systems.

3. To provide seed money for research on new transportation systems and technologies and assist in assessing their feasibility.

4. To foster a program of national research in transportation at the country's universities and research institutions.

5. To promote adoption of new technologies and reassert U.S. international technical leadership in transportation by fostering increased awareness of, and interest in, research and development activities.

The Committee endorses these objectives. They offer a reasonable approach for the Federal Government to take as it helps U.S.-based industry regain a competitive position in all aspects of surface transportation. However, current Department of Transportation research and development efforts stand in stark contrast, both to these goals and to the enormity of the research and development problems to be addressed. According to the 1990 annual report of the Department of Transportation's Transportation Systems Center, only a tiny portion of the approximately $424 billion that the United States spends annually on transportation is dedicated to research and development in the government and the private sector. The U.S. has fallen significantly behind Western Europe and Japan in transportation R&D. Furthermore, corrective actions have not yet been taken. The Committee views the present largely uncoordinated research and development program at the Department of Transportation (DOT) as being inadequate and is convinced that the United States will fall further behind other industrial nations unless a strong and aggressive research and development program, encompassing a broad range of technologies, is established.

Currently, Department of Transportation research and development efforts are concentrated on a series of narrowly defined projects within the various administrations of the Department. Though some limited coordination of research and development (R&D) continues through the DOT Research and Development Coordinating Council, DOT no longer has a department-wide R&D coordinator within the Office of the Secretary of Transportation. Such a position was established briefly in 1985 but was dropped after proving ineffective. Budget cutbacks and the lack of coordination for R&D during the 1980's caused the various DOT R&D programs to become focused on supporting short-term program objectives unique to that form of transportation. This has led the Office of Technology Assessment to conclude in its 1991 study "Moving the Goods," that "* * * the lack of long-range and systems-oriented R&D has left DOT unprepared to address current national needs such as transportation-related air quality issues and intermodal and urban capacity problems." The Committee is committed to revitalization of these programs. It realizes that achieving the Department's research and development goals is a multiyear process and views this legislation as an important first step in that direction.

II. History of Subcommittee Activities

Since the early 1980's, the Committee has followed the surface transportation R&D programs of the Department of Transportation through hearings and other oversight activities. It has also followed the development of surface transportation technologies in other countries including high speed rail and magnetically levitated train technology in Europe. More recently, the Committee on Science, Space and Technology has taken field trips to stay current in intracity rapid rail technologies, including control room computer surveillance, control and communication systems, and in intelligent vehicle highway systems.

In preparation for this legislation, the Committee conducted legislative hearings on April 10, April 16, and June 4, 1991. Expert witnesses covered the full range of emerging surface transportation technologies including automotive R&D, intelligent vehicle highway systems, high speed rail systems, magnetically levitated trains, short haul passenger transportation systems, and surface transportation infrastructure research.

Special concerns of the Committee have included such research subjects as the application of superconducting materials for magnetically levitated trains. Electromagnetic field shielding and aerodynamic modeling of high-speed ground transportation systems are of particular importance. The Committee is also interested in human-factors research including the interface between driver and various intelligent highway systems, and in the cost of new technological systems.

III. Purpose and Explanation of H.R. 2941

H.R. 2941 is envisioned as the nucleus around which surface transportation research and development can grow in strength and effectiveness. The purpose of H.R. 2941 is to enhance the quality of

research and development in surface transportation systems in the United States through increased and more sharply focused R&D activities at the Department of Transportation. International competition has become formidable, and there is a crucial need for the United States to perform its R&D activities successfully and in a timely manner. If modern U.S. transportation systems do not reach the market before foreign technologies, the foreign technologies will dominate the U.S. transportation infrastructure. The Secretary of Transportation is asked to take two steps to enhance transportation, research and development. The Secretary is to develop an integrated plan for surface transportation research and development and to take initial steps towards implementing a number of specific research programs. By requiring an overall R&D plan, the Committee also hopes DOT R&D efforts will not only lead to advanced technologies becoming available for commercial use within much shorter periods of time, but will also enhance basic surface transportation research through a long-term generic research program. Through this planning exercise, the Committee expects the Secretary to review the ongoing research efforts in light of its research objectives and to set out an integrated research program that can help the U.S. transportation and transportation construction industries operate at world-class levels in the early 21st century. However, in reviewing various reports on surface transportation R&D, the Committee became convinced that a consensus existed regarding certain transportation systems of the future. The bill and this report identify these objectives, and the bill has marked small amounts of funding to be set aside for review and initiation of the specific programs.

It is the intent of the Committee to review the R&D programs in the Department over the next several months. The Committee will undertake oversight activities in order to develop a working relationship with individuals in the Department and become more aware of their accomplishments. While calling for a comprehensive R&D program in the Department, and, at the same time, limiting the allocation of funding, the Committee has given the Secretary the opportunity to review the Committee's intentions and will expect comments when the FY 1993 budget request is submitted to Congress. If needed, further legislative activity will occur in 1992.

IV. Policy

The Department of Transportation is the lead agency and coordinator for all federally funded surface transportation research, development, and testing. Beginning in Fiscal Year 1992, the Department of Transportation is asked to organize and coordinate its research and development activities through a central office reporting directly to the Secretary of Transportation which makes maximum use of existing R&D activities in the various administrations within the Department. It is the desire of the Committee that, beginning in 1993, all surface transportation research and development programs of the Department will be coordinated with a Department of Transportation headquarters office for research, development, and testing.

This office should have the responsibility to cooperate with, and enlist the services of, other departments and agencies in the Federal Government, industry, the national laboratories, and universities when such organizations can make significant contributions to the research programs of the Department of Transportation. Coordination with the Department of Energy is especially important. The office is also expected to become the national repository for information on international transportation research and development activities, foreign objectives, and resources which pertain to surface transportation technologies.

The Committee asks the Secretary to propose a schedule for significantly increasing R&D funding and for identifying the organizational structure and scope of research and development effort to be undertaken in the near term and on a longer-term basis for the various emerging transportation technologies.

Finally, the Department addressed long-term programs in its January 1991 R&D statement in the following fashion: "It is the DOT R&D policy to structure an R&D program * * * that reflects a balance between short-term needs and providing longer-term options for system development." However, the OTA analysis in the June 1991 report on "Delivering the Goods" concludes, "Long-range planning and R&D that look ahead to future problems simply do not exist at DOT * * *" In order to correct this imbalance, the Committee has taken two actions. The Committee has added a provision to this legislation requiring the 15 percent of all surface transportation research funds be used in long-term research programs. Long-term research is defined to mean a research project that will not be completed within ten years unless a research breakthrough occurs or similar unexpected progress permits the project to be completed in a shorter time. This permits the Department to continue to expend most of its R&D resources on immediate problems and developing specific technologies while guaranteeing that sufficient funds are available for longer term generic transportation research. The Committee bill, as reported, also would add research in basic highway vehicle science to the list of purposes of the DOT found in Title 49 and amend the list of duties of the Secretary of DOT found in Title 49 to include stimulating technological advances in transportation "through research and development."

V. Section-by-Section Explanation of the Bill

SECTION 1. SHORT TITLE

This Act may be cited as the "Surface Transportation Research and Development Act of 1991."

SECTION 2. FINDINGS

The findings describe the shortcomings of existing transportation systems in the United States and the lack of coordinated planning in preparation for our transportation systems of the future. They note that the Federal Government devotes insufficient resources to transportation research and development and has not developed a clear vision regarding U.S. transportation systems of the future.

The federal research and development role in assuring that appropriate transportation systems are developed and implemented also is not well defined. Transportation demands in and between urban areas will increase as population increases, and the development of safer technologies is a high priority. Automobiles will remain the principal mode of surface transportation for the foreseeable future, but they will change dramatically with the increased computerization of autos and the advent of intelligent vehicle highway systems. Rail systems, especially high speed rail and magnetically levitated train technologies, hold promise for intercity transportation in high density corridors, but we in the United States are not currently taking the steps necessary for these technologies to achieve their potential. Our technical expertise in high speed rail is waning because we have not built domestic high speed rail systems. The current state-of-the-art of magnetically levitated trains does not appear to be commercially viable in any country. The efficiency of rail and air transportation is hurt by the inefficiency of the urban, short-haul transportation systems including autos and buses which connect the airports to the travelers' starting points and ultimate destinations. The Federal Government has an important role to play both in the development of these new technologies and making sure they fit together into a coherent intermodal transportation system.

SECTION 3. SURFACE TRANSPORTATION RESEARCH AND DEVELOPMENT PLAN

The Committee believes that the Department's transportation plan "Moving America" and the January 1991 statement on "Research and Development Policy" are good policy statements that should be implemented. The Committee requests that the Department of Transportation research plan be expanded, updated, and submitted to Congress annually in January to coincide with the submission of the President's budget to Congress. If the plan is submitted in advance of the budget, the Committee will accept the plan without budget information, so long as the detailed budget information to back up the plan is provided to the Committee concurrent with the President's budget. The first plan is due within 180 days after the date of enactment of this Act. The Department is to describe the plan in sufficient detail as to assure the work conforms to the objectives contained in the Act. The plan is to be complete, identifying specific scopes of work, organization of personnel, milestone schedules, estimated costs by phase of activity, current state-of-the-art, and accomplishments. Plans and organization for future activities should also be included.

The Committee recognizes the difficulty in estimating costs of new systems before the full breadth of the work is sufficiently understood. For this reason, the Secretary is urged to consider his planning in two stages: broad scope cost estimates clearly identified as being preliminary in nature to be followed a year later with firm cost estimates from which the Congress can make informed decisions for budgeting purposes.

The plan is to include all ongoing research and development activities throughout the Department and its Administration, as well

as those planned for future years whether or not they are identified in section four of this bill. The plan shall also include a ten-year, long-term research and development program.

The Committee recognizes the importance of assuring that universities in less developed states participate fully in the research activities of the Department of Transportation. Therefore, the plan should include a program, modeled after the Experimental Program to Stimulate Competitive Research (EPSCoR) program at the National Science Foundation, to assure that universities in the designated EPSCoR states participate fully in the university-based research activities.

The plan should show near-term research budgets by project and long-term projects by general objective. In the first three years, program schedules, project costs, estimates of costs to complete each program, and major contracts must be described.

The Committee recognizes the importance of technology transfer to commercial competitiveness. Inclusion of the provision requiring cooperation with industry during the development of the plan should further this objective. In order to prevent overlapping research, the Department is to coordinate its planning efforts with other federal agencies, as appropriate.

SECTION 4. RESEARCH AND DEVELOPMENT PROGRAMS

(a) Automotive structures

Automotive R&D is to be directed toward the improvement of automobile structures to enhance safety and specifically to reduce the number of injuries and fatalities which occur as a result of impact during collisions with obstructions and other vehicles. In carrying out this R&D and prototype testing of safety systems, however, the Secretary is to take into account the useful life and the cost of producing and maintaining such structures. The Department is expected to work with private industry on this program.

Reckless driving detection

This part of the automotive program includes a provision for the purpose of developing technologies to quantify reckless driving and to reduce the incidences of reckless driving. A high percentage of motor vehicle accidents are caused by reckless driving, including multiple lane changes at high rates of speed in close proximity to other vehicles. At present, there does not appear to be any way to quantify such behavior. The Committee believes that a combination of existing technologies, including video recording, can be configured into such a system that can verify and record reckless driving as well as identify the vehicle involved. The Secretary is to consider the use of existing technologies in the development of a mobile detection, identification, and documentation system.

Multiple trailer trucks

Such vehicles may be less maneuverable, and less predictable, and therefore may constitute a more severe hazard than tractors with single trailers. The effect that multiple trailers can have on highway safety is a major national concern. For this reason, the Committee authorizes the Secretary to establish a program which

can quantify the behavior of such vehicles and predict their influence on future accident rates.

(b) Advanced automotive technologies

This section would bring the benefits of government-funded, precompetitive generic technology to the auto industry. It mandates that the Secretary of Transportation support auto industry-led efforts in long-term basic research, to facilitate commercial adoption of advanced technologies, and to utilize technology transfer programs of the federal laboratories including the Regional Centers for the Transfer of Manufacturing Technology of the National Institute of Standards and Technology.

(c) Intelligent vehicle highway systems

Intelligent vehicle highway systems (IVHS) are considered to be a primary research and development goal for surface transportation in the United States. Americans love the freedom provided by their cars, and the Committee assumes that individual automobiles operating on roads will continue as the primary mode of American transportation in the 21st century, but that intelligent vehicle highway systems with the increasing level of sophistication will, over time, make high density auto traffic safer, cheaper, faster, and more efficient. Indeed, elementary intelligent highway systems already in place in a number of metropolitan areas.

The Committee has not specified any R&D for intermediate systems like signal traffic control, in-vehicle displays, and traffic routing. These systems are understood and will be implemented in time as local economics permit. Instead, the Committee is looking further into the future and has called for a completely automated highway prototype roadway with automated vehicles.

The Committee recognizes this as an aggressive plan but is also aware a basic technology for a completely automated roadway was developed in the early 1960s. At that time, such a system was installed by RCA at the David Sarnoff Research Laboratories in Princeton, New Jersey. The Committee expects the Department to work aggressively with interested U.S.-based companies in the development of an IVHS prototype so that there is U.S. participation when advanced IVHS systems enter the market a few years from now. However, the Committee does not expect the Department of Transportation to have an active highway in full automatic operation by a specific date.

The prototype system is also to be developed to give the public the opportunity to use it and, as such, it is to be a system for enhancing human-factor provisions as well as enlisting public acceptance.

(d) High speed rail systems

The Committee recognizes the state of the art of high speed rail systems and that such a system based on European technology may well be built in Texas in the near future. Therefore, a research and development program, as such, has not been included in the bill. A more important federal role is standardization: assuring that the U.S. avoids the problems that would occur should a number of such systems be constructed to different standards. Not only is the

gauge of the track a potential problem but the type (AC or DC) of voltage, frequency, and phase of electric power could very well become problems. The Committee has, therefore, called for recommendations from the Department of Transportation on an optimum system which could become a national standard thereby allowing for interconnection of such systems in the future.

The Department of Transportation high speed rail effort is also to include a report on private sector capability related to the engineering, design, component manufacturing, fabrication and assembly of power systems, control systems, motors and drive systems, coaches, track structures and communication systems and services associated with high speed rail. Based on this assessment, the Secretary is expected to recommend courses of action as to how the government and private sector can successfully work together to regain lost capabilities through research and development in this vital area of transportation.

(e) Magnetically levitated trains (maglev)

Magnetically levitated train technology offers a convenient, comfortable, and potentially safe way to travel in the future.

Maglev is a surface transportation system that can supplement air travel over intermediate distances of up to approximately 600 miles. However, it may not be as cost effective as high speed rail systems, and it does not appear to be appropriate for short distance travel such as in suburban/urban commuting where existing electric rail systems are efficient and reasonably cost effective.

The Committee believes research and development of a U.S. maglev system should be a top priority for the Department of Transportation. At the present time, there is an opportunity for the U.S. to organize a significant effort to compete with other nations in developing a system based on superconducting materials. Progress in superconducting R&D in 1990 included the development of magnets in the seven tesla range and wire capable of conducting one million amperes per square centimeter, albeit at temperatures of 4.2K. This progress provides the incentive to move ahead with superconducting research and with research and development of subsystems that could be incorporated in the design of a magnetically levitated train system in the future.

Since electromagnetic fields generated by the superconducting magnets are not tolerable in maglev coaches, the Committee requests the Department of Transportation to undertake a sub-program on research and development of shielding systems. This subprogram is expected to include the prototype development and testing of one or more such subsystems.

Currently, aerodynamic problems created by the high speeds associated with maglev, need to be solved before maglev can be used as a commercial system. For this purpose, the Committee recommends working with the National Aeronautics and Space Administration to study, compute, and, though model testing in wind tunnels, verify various proposed solutions to safety problems caused by sudden wind pressure variations created when maglev vehicles pass each other as well as to the potential effect of wind gusts resulting from strong surface winds.

The Department has undertaken several studies on the feasibility of operating a magnetically levitated train as a viable method of transportation. One such example is the June 1990 Department report on the "Assessment of the Potential for Magnetic Levitation Transportation Systems in the United States." The report left somewhat vague the amount of funding necessary to conduct the research necessary to build and operate a system in a specific location.

Accordingly, the Committee requests the Department to determine the cost of the research needed to develop the technology and the cost of building and operating a maglev system in the United States and to devise a program for the transfer to U.S. industry of any information obtained through research under this subsection or otherwise that would promote the development of a viable commercial magnetically levitated rail transportation industry within the United States.

(f) Short Haul Passenger Transportation

The Committee notes that there are effective short haul passenger transportation systems in operation in the U.S. today. One of the most effective, quiet, safe, fast, and appropriate energy vehicles is the "trackless trolley", which is currently used in San Francisco and Philadelphia. Although it is not new, technically speaking, it is effective. However, such a system is no longer accepted by the public because of the double overhead wires essential for powering it.

Diesel buses on the other hand, are polluting, slow, and costly. In spite of this, they provide a vital service in filling the needs of commuters and providing the means to connect with other forms of transportation such as rail and air systems. As such, buses are necessary unless some other technology can be as effective. The Committee recognizes, in order to be effective, the new technology will have to be convenient, flexible, safe, clean, affordable, and should also contribute to reducing dependence on oil.

To meet this need, the Committee looks to the Department of Transportation to consider study alternatives, and recommend a systems concept for short haul service, preferably battery- or fuel-cell powered. In doing this, the Committee notes that battery development has not progressed to the point where it can be readily used for most surface vehicles. In spite of work in such technologies as aluminum air and sodium sulfur, the demands placed on batteries for transportation service far exceed the capabilities of existing technologies for anything but the lightest short-range applications. On the other hand, the application of deep discharge cells when used over short distances could make an electric short-haul system practical if the cells can be made to withstand frequent rapid recharging through many cycles. Such a system might be recharged every four or five miles through underground contacts.

Other features could also help make the concept included in the bill practical. For example, solid rubber or pneumatic tires when used in conjunction with a new suspension technology could reduce electric power consumption thereby extending the range of the system.

The Committee also sees this system as one possible way to move out ahead of foreign competition in surface transportation systems.

(g) Supporting Infrastructure

The DOT research policy in infrastructure is explained in the January 1991 "United States Department of Transportation Research and Development Policy." The goal of the research program is to "maintain and expand the nation's transportation system—which will be supported by research to improve the capacity, condition, and utilization of existing transportation systems and infrastructure."

The current increase in vehicles on the nation's roads and highways has served to increase the time such roads are "out of service." Not only does this cause inconveniences, but detouring of vehicles frequently results in traffic accidents. New longer-wearing and durable materials are essential for economic reasons and for safety. The Committee, therefore, looks to the Department to lead the effort and work with other organizations on a broadly based materials program directed towards the transportation infrastructure.

The bill also calls for the development of a concept for a mobile robotic machine that could make road repairs in less time at less cost. Based on the concept, the Committee may elect to authorize a development program including industry participation.

For the foregoing reasons, the Committee authorizes the Secretary to establish a comprehensive infrastructure research program. A research effort to further develop nondestructive evaluation (NDE) equipment is to be included in the program. The goal of this effort is to further develop technologies that can detect corrosion, wear, and structural flaws of bridges and other load bearing structures in the field. Enormous savings in both time and money would result from such field testing if corrective maintenance was undertaken early.

This section calls for research into the use of high energy radiography, including the possible use of Californium 252, as a means of detecting deterioration in structures while the deterioration is still in the early stages. It is the intent of the Committee that the Department investigate this area and confer with experts in the national laboratories, universities, and private industry, as appropriate, in order to determine the feasibility, the range of deployment and cost/benefits associated with this technology.

The Committee also believes that in order to develop a comprehensive program of infrastructure research, adequate data on the current status and future infrastructure needs is necessary. The June 1991 OTA Report stated that, "At present we are making decisions about billions of dollars in federal expenditures based on 15-year-old data that were inadequate to begin with." The Department has taken steps to initiate research in this area. The January 1991 DOT R&D policy states that DOT believes it is appropriate to sponsor research to "experiment with innovative ways to make federal transportation data, research findings, and information on technology and innovation in transportation available to researchers, industry and all levels of government."

The Committee believes that, in addition to this effort, comprehensive data collection and utilization to benefit both short- and long-term research is urgently needed. Moreover, this computer data-based program should be able to predict future capacity, safety, and infrastructure durability problems. This will be especially important for new and innovative materials that will be utilized in future infrastructure. The Committee has also authorized a program requiring that the computer-based system be available for evaluating proposed infrastructure research programs to determine potential problems and strengths before the products of the research are implemented in the field.

The Committee has received testimony on the effects that high speed rail trains and magnetically levitated vehicles can have on bridge structures. This appears to be a matter of higher frequency loadings, and the concern in this regard is principally one of fatigue as the number of cycles over a period of years could be greater by orders of magnitude. If so, the life expectancy of such structures could be short. The Department is expected to thoroughly investigate and analyze this matter to determine what action the government should take and to what extent it should participate in providing new design information to private engineering firms as well as state and local governments.

The Committee recognizes that the changing materials composition of automobiles and automobile components has added to the complexity of recycling autos. Yet, large amounts of desirable materials are contained in these vehicles. The Committee, therefore, has required the Secretary to conduct a study of the major obstacles to recycling, methods of planning for recyclability in the design and manufacture of autos including materials substitution, and research opportunities in each of these areas. The Secretary is also required to consult with a variety of affected parties while conducting the study and to report to Congress on these matters within a year of enactment.

The Secretary is also to conduct a research and development program on the use of non-hazardous solid wastes in the construction of our nation's highways and railways.

SECTION 5. RESEARCH ADVISORY COMMITTEE

The Research Advisory Committee (RAC) is established to ensure that the Department takes maximum advantage of available outside advice in planning and evaluating its research program and projects, especially the long-term efforts. The Committee understands that the Department's research must both feed and be fed by the research programs of other organizations, and that the results of the Department's research must serve the interests of the surface transportation community of the United States. Both these objectives will be furthered by the establishment of the RAC which is to be formed after the report by the National Council on Surface Transportation Research is submitted September 30, 1993.

The Committee intends that the RAC function under Department guidance and provide its advice to the Secretary. An annual reporting provision has been included for public access to the activities of the Committee. If the RAC is to be effective, it is vital

that the Secretary select the surface transportation research experts who can provide the best advice. The Committee recommends that the Secretary appoint RAC members for short, staggered terms. To ensure a succession of fresh views, no member should serve indefinitely; but to ensure continuity, a staggered three-year term is recommended. The RAC is intended to solicit outside advice, and while the Department should encourage its research and operational staff to be available to the RAC and attend its meetings, the voting membership of the RAC should not include Department employees.

Appointees to the RAC should be selected on the basis of their technical knowledge of the state-of-the art and the requirements for the research, rather than as representatives of organizations. Yet the RAC would not be useful if major Department constituencies were ignored. The Committee realizes that the RAC would be impossibly large if, for example, all trade associations or universities sent representatives. The rotating terms should make it possible to broaden representation without having an unnecessarily large committee.

The Committee does not intend that RAC members be paid for their time, but recognizes that, in some instances, individuals cannot incur the transportation expenses necessary to participate. Staff support for the RAC is expected to be provided without reference to the limitation. The Committee is aware of certain funding limitations for advisory DOT Committees and, therefore, the "application of certain limitations" clause is intended to exempt the RAC from these and other limitations.

The Committee expects that there will be a need for certain research advice which is too specialized to be effectively considered by the full RAC. The use of subordinate committees composed of experts with specialized backgrounds to deal with specific technological issues is encouraged under the provision of the full RAC.

The Committee strongly believes that the Department should establish a state-of-the-art research program in advanced highway vehicle technology. To ensure that the best scientific research programs in highway vehicle technology are conducted by the Department, a subordinate DOT Committee of the Research Advisory Committee on Highway Vehicle Technology is established. The purpose of the permanent subordinate Committee on highway vehicle R&D technology is to ensure that the agency has the best scientific advice available on which to establish a world-leading research program.

SECTION 6. LONG-TERM RESEARCH

The Committee believes that the Department must strive to strike a balance between investing in our future through long-term research and promoting research, development, and demonstration with more immediate payoffs. Therefore, this section mandates that 15 percent of the amounts appropriated for surface transportation research and development shall be for research projects unlikely to be commercialized within 10 years.

SECTION 7. ADVANCED AUTOMOTIVE CONFERENCE AND AWARD

The Stevenson-Wydler Technology Innovation Act of 1980 established a program to improve the nation's industrial technology. The Act also establishes a National Technology Medal for companies that have made outstanding contributions to the promotion of technology.

The Committee believes that in order to examine and analyze the strengths and weaknesses of the U.S. motor vehicle industry, a conference on advanced automotive research technologies should be convened. Accordingly, the Committee encourages the Department of Transportation to convene a conference of automotive experts to examine ways in which technology transfer of research results from the federal laboratories can improve U.S. motor vehicle industrial competitiveness. The results of the conference would be published and submitted to Congress. It is the view of the Committee that the recommendations of the conference should focus on the research necessary to improve U.S. competitiveness in automotive technology.

SECTION 8. RESEARCH AND DEVELOPMENT AUTHORITY OF SECRETARY OF TRANSPORTATION

Title 49 of the U.S. Code, subtitle I, lists the purposes of the Department of Transportation (DOT). The Committee believes that the Department purposes should also include basic research. Specifically, DOT is to promote and undertake research and development related to transportation. The Committee adds the requirements to "include basic automotive highway vehicle science." The Committee believes that DOT should have a mandate to conduct research in long-term, high-risk basic highway vehicle science.

SECTION 9. PURPOSES OF DEPARTMENT OF TRANSPORTATION

This Section amends Title 49, USC, subchapter I on the duties of the Secretary of DOT to include that the Agency will stimulate technological advances in transportation "through research and development." The Committee believes that both basic scientific research and research in long-term, high-risk highway vehicle sciences, are very important. Accordingly, the Committee authorizes research to be included in the fundamental mandates of the Agency.

SECTION 10. USE OF DOMESTIC PRODUCTS

This section contains "Buy America"' language similar to language contained in numerous other bills. It prohibits fraudulently labelling products made in America and requires that procurements made by the Secretary of Transportation be consistent with the Buy America Act.

SECTION 11. AUTHORIZATION OF APPROPRIATIONS

The Committee expects the program contained in this legislation to be carried out through a redirection of funds. Therefore, it has calculated the funds needed to perform the work identified in the bill, H.R. 2941, on the basis of a percentage of the amount of funds

included in the Administration's budget. No additional funds are required to support the programs identified in this report. The amounts calculated are as follows:

Fiscal year 1992—8 percent of $164,500,000, which is $13,160,000.
Fiscal year 1993—10 percent.
Fiscal year 1994—15 percent.

The Committee realizes that full implementation of this research program will take a number of years and a budget substantially in excess of the Department's current surface transportation research and development efforts, and expects subsequent budgets to include the resources necessary to carry out the Department's research and development plan.

VI. Committee Views

AUTOMOTIVE RESEARCH AND DEVELOPMENT

The Office of Science and Technology Policy's March 1991 report on the "National Critical Technologies" recommended that, "Advanced surface transportation technologies can relieve growing congestion on U.S. highways, improve vehicular safety and fuel efficiency . . . Surface transportation technologies offer important potential contributions to more efficient and cost-effective transportation systems for the nation." The Committee believes the Department has not moved aggressively in conducting the necessary research in advanced automotive technology to maintain our nation's competitiveness and, therefore, looks forward to an increase in R&D activities in this area in the years ahead.

The Committee expects the Secretary to undertake, or supervise, a program in automotive science. The automotive science program is to be directed toward the improvement of automobile safety and specifically to reduce the number of injuries and fatalities which occur as a result of vehicle collisions with obstructions and other vehicles. In conducting this program, the Secretary is to take into consideration research that would also reduce the cost of producing and maintaining automotive vehicles, as well as extending their useful life. The Department is expected to cooperate and coordinate this effort with universities and private industry.

Advanced materials could be used more extensively in the next generation of automobiles and trucks. If these materials are developed in the United States first, it could give the U.S. automotive industry a competitive advantage.

In spite of the competitive potential of new materials, the Committee recognizes the need of perform a range of R&D activities, including the design and testing of composite materials behavior on impact in order to explore "shattering effects" and energy absorption.

The Committee recognizes new automotive subsystems which assist driver control. Some Japanese cars are already being equipped with such systems as warning and automatic braking when a vehicle approaches an obstruction at an unsafe speed. As a result, the Committee looks to the Department of Transportation to work with industry in developing safety-related subsystems.

MULTIPLE TRAILER TRUCKS

The Committee is interested in the further development of multiple trailer trucks. Debates in Congress on the use of such vehicles are expected; and, in the opinion of the Committee, the possible danger in expanding such vehicles can be verified or refuted by developing extensive computer software for computer simulation of such vehicles under a wide range of loadings, wind speed, traffic, turning, braking and paving conditions. However, any such computer simulations should be verifiable under actual testing. This R&D is expected to not only save needless costs should trucks be built and operated before the dynamics are fully understood, but could also save lives if they are found to be unsafe.

HIGHWAY SAFETY ASSURANCE

The Committee is of the opinion highway fatalities and injuries are caused by reckless driving. While police are able to detect and quantify speeding, reckless driving is more a matter of opinion. As such, charges of reckless driving are often dropped for lack of evidence. The absence of equipment capable of quantifying and recording reckless driving serves to promote such behavior. The bill, therefore, calls for researching the technologies that can be applied for such purposes, employing appropriate technologies, and developing a system which is both cost effective and has the precision to detect, track, and record reckless driving. The Committee understands that such a system could entail state legislation defining reckless driving consistent with the capabilities of the detection system.

TRANSPORTATION INFRASTRUCTURE

The nation's surface transportation infrastructure has reached a serious state of disrepair. While the Intermodal Surface Transportation Infrastructure Act of 1991 has provided for new construction which will alleviate many existing problems in surface transportation, research and development of new materials, construction, and maintenance methods, new machinery including the use of robotics, and new non-destructive examination techniques and equipment will become even more essential to all transportation modes in the future.

The Committee is also concerned about the influx of heavy construction equipment from foreign nations. The concern is whether or not the private sector is able to innovate and develop new more productive, easy to operate, and reliable equipment and whether or not the government could provide some form of assistance to private U.S. firms so that they could be more competitive in the international market.

ADVANCED AUTOMOTIVE TECHNOLOGY

U.S. automotive production and technology development have declined in recent years, while the United States sales of automobiles manufactured overseas have increased. In the global marketplace, long-term research and development is necessary if the nation's automotive industry is to remain competitive.

Nationwide, more than 33 percent of all industrial research comes from Federal government sources but less than 20 percent of automotive research is funded by the Federal government. Moreover, the Department's research budget in surface transportation represents only one percent of the total budget.

Therefore, the Committee directs the Department to work with U.S. industry and academia to establish an advanced automotive technologies research program. The program shall include generic long-term basic research into technologies that will advance U.S. automotive technology. The Committee understands that the Department may not have the necessary in-house scientific expertise to conduct a long-term advanced automotive research program. Therefore, joint research programs with academia will provide the avenue for the Department to have access to the best automotive research scientists in the Nation. In order to utilize the expertise from this pool of research scientists, the Department is authorized to make grants to universities or other research organizations.

The Committee authorizes the Department to work with the National Institute of Standards and Technology to transfer advanced manufacturing technology.

HIGH SPEED RAIL

The Committee believes that one of the most important areas of surface transportation is high speed rail. The Administration's January 1991 statement on R&D establishes that research must be conducted to "keep the transportation industry strong and competitive * * *" The Committee believes that high speed rail falls into this category. Accordingly, the Committee directs that, in order to advance U.S. transportation, the Department examine the potential for U.S. industry and universities to conduct research on advanced high speed rail that would result in the development to technologies leading to an internationally competitive commercial industry.

In addition, the Committee believes that Department should study the unresolved R&D issues that need to be completed in order for U.S. industry to build and operate advanced high speed railroads. Accordingly, the Committee directs the Department to undertake an assessment of the research needed to reach this goal.

VII. Committee Oversight Activities

Pursuant to rule XI, clause 2(l)(3) of the Rules of the House of Representatives, and under the authority of rule X, clause 2(b)(1) and clause 3(f), the following oversight activities were undertaken.

Since the early 1980's, the Committee on Science, Space, and Technology has followed the surface transportation programs of the Department of Transportation through hearings and oversight activities. Most recently the Committee has taken field trips to stay current in intercity rapid rail and highway construction.

The Committee conducted three hearings in preparation for this legislation. Two days of oversight hearings on Surface Transportation R&D were held. On April 10 and April 16, 1991, Mark Dowis, Associate Administrator for Research, Technology and Analysis, Research and Special Programs Administration, U.S. Department

of Transportation; accompanied by William Leasure, Jr., Director, Office of Crash Avoidance Research, National Highway Safety Administration; Dennis C. Judycki, Associate Administrator for Safety and System Applications, Federal Highway Administration; Robert L. Krick, Director, Deputy Associate Administrator, Technology Development, Federal Railroad Administration; and Lawrence L. Schulman, Associate Administrator, Urban Mass Transportation Administration testified as did several witnesses who are transportation experts from the private sector. On June 4, 1991, the Committee conducted a legislative hearing on this bill which featured a variety of additional private sector witnesses.

The results and findings from these oversight activities are incorporated in the recommendations found in the present bill and report.

VIII. Oversight Findings and Recommendations by the Committee on Government Operations

No findings and recommendations on oversight activity have been submitted by the Committee on Government Operations for inclusion in the report, pursuant to rule X, clause 2(b)(2) and rule XI, clause 2(l)(3) of the Rules of the House of Representatives.

IX. Budget Analysis and Projection

The Act provides for new authorization rather than new budget authority or tax expenditures. Consequently, the provisions of section 308(a) of the Congressional Budget Act are not applicable.

X. Cost Estimate of Congressional Budget Office

U.S. Congress,
Congressional Budget Office,
Washington, DC, November 12, 1991.

Hon. George E. Brown, Jr.,
Chairman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has reviewed H.R. 2941, the Surface Transportation Research and Development Act of 1991, as ordered reported by the House Committee on Science, Space, and Technology on November 7, 1991.

Enactment of H.R. 2941 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

Robert D. Reischauer,
Director.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

1. Bill number: H.R. 2941.
2. Bill title: The Surface Transportation Research and Development Act of 1991.

3. Bill status: As ordered reported by the House Committee on Science, Space, and Technology, November 7, 1991.

4. Bill purpose: H.R. 2941 would authorize appropriations totalling $544.5 million over fiscal years 1992 through 1994 for surface transportation research and development activities of the Department of Transportation (DOT). Under current law, there is no single appropriation for surface transportation research and development at DOT. The various administrations within the department with responsibility for ground transportation programs receive separate funding for efforts under their jurisdiction.

In addition, the bill would direct the Secretary of Transportation to:

Develop an integrated national plan for surface transportation research and development;

Conduct several specific research and development programs;

Convene a conference on advanced automotive technologies; and

Establish an independent surface transportation research advisory committee.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1992	1993	1994	1995	1996
Authorization level	(1)	180	200		
Estimated outlays	(1)	72	161	117	30

[1] H.R. 2941 authorizes $164.5 million for fiscal year 1992. The 1992 transportation appropriation bill has already been signed into law, and includes funding for surface transportation research and development that exceeds the authorization level in this bill.

The costs of this bill fall within budget function 400.

Basis of estimate: The funds provided for surface transportation research and development activities in the Department of Transportation and Related Agencies Appropriations Act for 1992 (Public Law 102–143) exceed the amount that would be authorized for that year by H.R. 2941, so CBO assumed that no additional funds would be appropriated for this year. We assumed that the full amounts authorized for fiscal years 1993 and 1994 would be appropriated prior to the beginning of those years. Outlays are based on historical spending patterns for similar programs.

6. Pay-as-you-go considerations: The Budget Enforcement Act of 1990 sets up pay-as-you-go procedures for legislation affecting direct spending or receipts through 1995. CBO estimates that enactment of H.R. 2941 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

7. Estimated cost to State and local governments: None.

8. Estimate comparison: None.

9. Previous CBO estimate: None.

10. Estimate prepared by: Marjorie Miller.

11. Estimate approved by: C.G. Nuckols, for James L. Blum, Assistant Director for Budget Analysis.

XI. Effect of Legislation on Inflation

The anticipated inflationary impact of this legislation has been assessed in accordance with rule XI, clause 2(l)(4) of the Rules of the House of Representatives. No inflationary effect on prices and costs in the national economy is expected.

XII. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italics, existing law in which no change is proposed is shown in roman):

The Stevenson-Wydler Technology Innovation Act of 1980

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SEC. 10. ADMINISTRATIVE ARRANGEMENTS.

(a) * * *

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(d) Cooperative Efforts.—The Secretary and the National Science Foundation shall, on a continuing basis, provide each other the opportunity to comment on any proposed program of activity under section 7, 9, 11, 15, 17, or [18] *20* of this Act before funds are committed to such program in order to mount complementary efforts and avoid duplication.

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SEC. 18. CONFERENCE ON ADVANCED AUTOMOTIVE TECHNOLOGIES.

Not later than 180 days after the date of enactment of the Surface Transportation Research and Development Act of 1991, the Secretary, through the Under Secretary of Commerce for Technology, in consultation with other appropriate officials, shall convene a conference of domestic motor vehicle manufacturers, parts suppliers, Federal laboratories, and motor vehicle users to explore ways in which cooperatively they can improve the competitiveness of the United States motor vehicle industry by developing new technologies which will enhance the safety and energy savings, and lessen the environmental impact, of domestic motor vehicles, and the results of such conference shall be published and then submitted to the President and to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

SEC. 19. ADVANCED MOTOR VEHICLE AWARD.

(a) Establishment.—There is established a National Award for the Advancement of Motor Vehicle Research and Development. The award shall consist of a medal, and a cash prize if funding is available for the prize under subsection (c). The medal shall be of such design and materials and bear inscriptions as is determined by the Secretary of Transportation.

(b) Making and Presenting Award.—The Secretary of Transportation shall periodically make and present the award to domestic motor vehicle manufacturers, suppliers, or Federal laboratory per-

sonnel who, in the opinion of the Secretary of Transportation, have substantially improved domestic motor vehicle research and development in safety, energy savings, or environmental impact. No person may receive the award more than once every 5 years.

(c) FUNDING FOR AWARD.—The Secretary of Transportation may seek and accept gifts of money from private sources for the purpose of making cash prize awards under this section. Such money may be used only for that purpose, and only such money may be used for that purpose.

SEC. [18.] *20.* PERSONNEL EXCHANGES.

The Secretary and the National Science Foundation, jointly, shall establish a program to foster the exchange of scientific and technical personnel amount academia, industry, and Federal laboratories. Such program shall include both (1) federally supported exchanges and (2) efforts to stimulate exchanges without Federal funding.

SEC. [19.] *21.* AUTHORIZATION APPROPRIATIONS.

(A)(1). There is authorized to be appropriated to the Secretary for the purposes of carrying out sections 5, 11(g), and 16 of this Act not to exceed $3,400,000 for the fiscal year ending September 30, 1988.

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SEC. [20.] *22.* SPENDING AUTHORITY.

No payments shall be made or contracts shall be entered into pursuant to the provisions of this Act (other than sections 11, 12, and 13) except to such extent or in such amounts as are provided in appropriation Acts.

SEC. [21.] *23.* USE OF PARTNERSHIP INTERMEDIARIES.

(a) AUTHORITY: Subject to the approval of the Secretary or head of the affected department or agency, the Director of a Federal laboratory, or in the case of a federally funded research and development center, the Federal employee who is the contract officer, may—

(1) * * *

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TITLE 49, UNITED STATES CODE

Subtitle I—Department of Transportation

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CHAPTER 1—ORGANIZATION

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§ 101. Purpose

(a) The national objectives of general welfare, economic growth and stability, and security of the United States require the development of transportation policies and programs that contribute to

providing fast, safe, efficient, and convenient transportation at the lowest cost consistent with those and other national objectives, including the efficient use and conservation of the resources of the United States.

(b) A Department of Transportation is necessary in the public interest and to—

(1) * * *

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(4) stimulate technical advances in transportation, *through research and development or otherwise;*

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CHAPTER 3—GENERAL DUTIES AND POWERS

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Subchapter I—Duties of the Secretary of Transportation

§ 301. Leadership, consultation, and cooperation

The Secretary of Transportation shall—

(1) * * *

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(5) promote and undertake research and development related to transportation, including noise abatement, with particular attention to aircraft noise, *and including basic automotive science;*

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XIII. Committee Recommendation

A quorum being present, on November 7, 1991, the Committee favorably reported the bill H.R. 1989 by a voice vote.

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